

L15 ANSWER 1 OF 3 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1
 AN 2004:182819 CAPLUS
 DN 140:237530
 TI Processes and catalysts for the preparation of 2-chloro-1,1,1,2,3,3,3-heptafluoropropane, hexafluoropropene and 1,1,1,2,3,3,3-heptafluoropropane
 IN Nappa, Mario J.; Rao, Velliur Nott Mallikarjuna; Rosenfeld, H. David; Subramoney, Shekhar; Subramanian, Munirpallam A.; Sievert, Allen C.
 PA E.I. du Pont de Nemours and Company, USA
 SO PCT Int. Appl., 29 pp.
 CODEN: PIXXD2
 DT Patent
 LA English
 FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 2004018397	A1	20040304	WO 2003-US26331	20030821
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU				
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				

PRAI US 2002-405222P P 20020822
 OS CASREACT 140:237530; MARPAT 140:237530
 AB A process for the preparation of 2-chloro-1,1,1,2,3,3,3-heptafluoropropane is described which involves: (a) contacting a mixture comprising hydrogen fluoride, chlorine, and at least one starting material selected from halopropenes CX₃CCl₁:CX₂ (X = F, Cl; Y = H, Cl, F; provided that the number of X and Y which are F totals \leq 6) and halopropanes CX₃CCl₁YCX₃, where each with a chlorofluorination catalyst in a reaction zone to produce a product mixture comprising CF₃CCl₁FCF₃, HCl, HF, and underfluorinated halogenated hydrocarbon intermediates. The chlorofluorination catalyst comprises at least one chromium-containing component selected from (i) a crystalline alpha-chromium oxide where at least 0.05 atom% of the chromium atoms in the alpha-chromium oxide lattice are replaced by nickel, trivalent cobalt or both nickel and trivalent cobalt, provided that no more than 2 atom% of the chromium atoms in the alpha-chromium oxide lattice are replaced by nickel and that the total amount of chromium atoms in the alpha-chromium oxide lattice that are replaced by nickel and trivalent cobalt is no more than 6 atom%, and (ii) a fluorinated crystalline oxide of (i). Also described is a process for the manufacture of a mixture of HFC-227ea and hexafluoropropene by reacting a starting mixture comprising CFC-217ba and hydrogen in the vapor phase at an elevated temperature, optionally in the presence of a hydrogenation catalyst.
 RE.CNT 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L15 ANSWER 2 OF 3 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 2
 AN 1992:20676 CAPLUS
 DN 116:20676
 TI Multistep synthesis of hexafluoropropylene from propane and propylene
 IN Webster, James Lang; McCann, Elrey Lorne; Bruhnke, Douglas William; Lerou, Jan Joseph; Manogue, William Henry; Manzer, Leo Ernest; Swearingen, Steven Henry; Trofimenko, Swiatoslaw; Bonifaz, Cristobal
 PA du Pont de Nemours, E. I., and Co., USA
 SO Eur. Pat. Appl., 33 pp.
 CODEN: EPXXDW

DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 434409	A1	19910626	EP 1990-313951	19901219
	EP 434409	B1	19941012		
	R: DE, FR, GB, IT				
X	US 5057634	A	19911015	US 1989-452402	19891219
	CA 2032273	AA	19910620	CA 1990-2032273	19901214
	CA 2032273	C	20020122		
	CA 2298099	C	20020108	CA 1990-2298099	19901214
	JP 04145033	A2	19920519	JP 1990-411690	19901219
	JP 2613683	B2	19970528		
PRAI	US 1989-452402	A	19891219		
	CA 1990-2032273	A3	19901214		

AB Hexafluoropropylene (I) is prepared by (1) chlorofluorination of at least one of propane, propylene, and partially halogenated C3 acyclic hydrocarbons with HF and Cl in the presence of a chlorofluorination catalyst to produce CF₃CFC₁CF₃ (II) and other chlorofluorocarbons such as C₃F₄Cl₄, C₃H₅Cl₃, CF₃CFC₁CF₂Cl, CF₃CCl₂CF₃, and CF₃CCl₂CCl₃ which are mostly recyclable to the same chlorofluorination step to give II and (2) dehalogenation of II to form I in the presence of a CuO-NiO-Cr₂O₃-CaF₂ (and-MoO₃) catalyst containing at least one of K, Cs, or Rb. In this process there is substantially no perfluoroisobutylene produced as a byproduct which is extremely toxic and is costly to remove and destroy. Thus, Cr₂O₃.3H₂O was charged to an Inconel tubular reactor and treated with a flow of HF at 400° for dehydration and thereto HF 90, Cl 35, and propylene 1.5 mol/h were fed at 440° and 790 kPa to give II 75, C₃F₆Cl₂ 7, C₃F₅Cl₃ 5, C₃F₇H 3, C₃F₆Cl₁H 5, C₃F₈ 2 and C₂F₅Cl 2%. A 1:1 (mol) mixture of H and a II feed containing II 79, CF₃CF₂CF₂Cl 17, and CF₃CCl₁:CF₂ 0.7% was passed over a catalyst CuO/NiO/Cr₂O₃/2.7 CaF₂ containing 7.9 weight% K at 402° to give 97% I with 63% conversion of II.

L15 ANSWER 3 OF 3 USPATFULL on STN

AN 91:84577 USPATFULL

TI Multistep synthesis of hexafluoropropylene

IN Webster, James L., Parkersburg, WV, United States

McCann, Elrey L., Mendenhall, PA, United States

Bruhnke, Douglas W., Landenberg, PA, United States

Lerou, Jan J., Chadds Ford, PA, United States

Manogue, William H., Newark, DE, United States

Manzer, Leo E., Wilmington, DE, United States

Swearingen, Steven H., Wilmington, DE, United States

Trofimenko, Swiatoslaw, Wilmington, DE, United States

Bonifaz, Cristobal, Conway, MA, United States

PA E. I. Du Pont de Nemours and Company, Wilmington, DE, United States
(U.S. corporation)

PI US 5057634 19911015

AI US 1989-452402 19891219 (7)

DT Utility

FS Granted

EXNAM Primary Examiner: Siegel, Alan

LREP Huntley, Donald W.

CLMN Number of Claims: 6

ECL Exemplary Claim: 1

DRWN 3 Drawing Figure(s); 3 Drawing Page(s)

LN.CNT 1458

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention relates to multistep syntheses of hexafluoropropylene from acyclic three-carbon hydrocarbons or partially halogenated acyclic three-carbon hydrocarbons. In all these syntheses the first step is a vapor-phase chlorofluorination of the starting material to one or more saturated chlorofluorocarbons. Novel catalysts

are also provided.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L18 ANSWER 1 OF 12 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1
AN 2004:182753 CAPLUS

DN 140:201451

TI Cobalt-substituted chromium oxide compositions, their preparation, and their use as catalysts and catalyst precursors

IN Nappa, Mario J.; Rao, Vellyur Nott Mallikarjuna; Rosenfeld, David H.; Subramoney, Shekhar; Subramanian, Munirpallam A.; Sievert, Allen C.

PA E.I. du Pont de Nemours and Company, USA

SO PCT Int. Appl., 68 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2004018093	A2	20040304	WO 2003-US26326	20030821
	WO 2004018093	A3	20040422		
		W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU		
		RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG		

PRAI US 2002-405220P P 20020822

AB A crystalline α -chromium oxide where 0.05-6 atom% of the chromium atoms in the α -chromium oxide lattice are replaced by trivalent cobalt (Co^{+3}) atoms is disclosed. Also disclosed is a chromium-containing catalyst composition comprising as a chromium-containing component the crystalline cobalt-substituted α -chromium oxide; and a method for preparing a composition comprising the crystalline cobalt-substituted α -chromium oxide. The method involves (a) co-precipitating a solid by adding ammonium hydroxide

to an aqueous solution of a soluble cobalt salt and a soluble trivalent chromium salt that contains ≥ 3 mol of nitrate/mol of chromium in the solution and has a cobalt concentration 0.05-6 mol% of the total concentration of cobalt and chromium in the solution; and after at least three moles of ammonium per mol of chromium in the solution has been added to the solution, (b) collecting the co-precipitated

solid formed in (a); (c) drying the collected solid; and (d) calcining the dried solid. Also disclosed is a chromium-containing catalyst composition comprising a chromium-containing component prepared by treating the crystalline cobalt-substituted α -chromium oxide with a fluorinating agent; and a process for changing the fluorine distribution (i.e., content and/or arrangement) in a hydrocarbon or halogenated hydrocarbon in the presence of a catalyst. The process involves using as the catalyst a composition comprising the crystalline cobalt-substituted α -chromium oxide and/or the treated cobalt-substituted α -chromium oxide.

L18 ANSWER 2 OF 12 USPATFULL on STN

AN 2004:134127 USPATFULL

TI Materials and methods for the production and purification of chlorofluorocarbons and hydrofluorocarbons

IN Iikubo, Yuichi, West Lafayette, IN, UNITED STATES

Owens, Stephen, White Pine, TN, UNITED STATES

Cohn, Mitchel, West Lafayette, IN, UNITED STATES

Brandstadter, Stephan M., Indianapolis, IN, UNITED STATES

Hedrick, Vicki E., Brookston, IN, UNITED STATES
Boggs, Janet K., Brownsburg, IN, UNITED STATES
Qian, John, West Lafayette, IN, UNITED STATES
Sacarias, Julie, El Dorado, AR, UNITED STATES

PI US 2004102664 A1 20040527
AI US 2003-699491 A1 20031031 (10)
RLI Division of Ser. No. US 2001-966158, filed on 28 Sep 2001, PENDING
DT Utility
FS APPLICATION
LREP WELLS ST. JOHN P.S., 601 W. FIRST AVENUE, SUITE 1300, SPOKANE, WA, 99201
CLMN Number of Claims: 88
ECL Exemplary Claim: 1
DRWN 7 Drawing Page(s)
LN.CNT 1969

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB Methods and materials are provided for the production of essentially isomerically pure perhalogenated and partially halogenated compounds. One embodiment of the present invention provides a process for the production of essentially isomerically pure CFC-216aa. Other embodiments include processes for the production of CFC-217ba and HFC-227ea. Particular embodiments of the present invention provide separation techniques for the separation of chlorofluorocarbons from HF, from other chlorofluorocarbons, and the separation of isomers of halogenated compounds. Still other embodiments of the present invention provide catalytic synthetic techniques that demonstrate extended catalyst lifetime. In other embodiments, the present invention provides catalytic techniques for the purification of isomeric mixtures.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L18 ANSWER 3 OF 12 USPATFULL on STN
AN 2004:134126 USPATFULL
TI Materials and methods for the production and purification of chlorofluorocarbons and hydrofluorocarbons
IN Iikubo, Yuichi, West Lafayette, IN, UNITED STATES
Owens, Stephen, White Pine, TN, UNITED STATES
Cohn, Mitchel, West Lafayette, IN, UNITED STATES
Brandstadter, Stephan M., Indianapolis, IN, UNITED STATES
Hedrick, Vicki E., Brookston, IN, UNITED STATES
Boggs, Janet K., Brownsburg, IN, UNITED STATES
Qian, John, West Lafayette, IN, UNITED STATES
Sacarias, Julie, El Dorado, AR, UNITED STATES
PI US 2004102664 A1 20040527
AI US 2003-698923 A1 20031031 (10)
RLI Division of Ser. No. US 2001-966158, filed on 28 Sep 2001, PENDING
DT Utility
FS APPLICATION
LREP WELLS ST. JOHN P.S., 601 W. FIRST AVENUE, SUITE 1300, SPOKANE, WA, 99201
CLMN Number of Claims: 88
ECL Exemplary Claim: 1
DRWN 7 Drawing Page(s)
LN.CNT 1970

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB Methods and materials are provided for the production of essentially isomerically pure perhalogenated and partially halogenated compounds. One embodiment of the present invention provides a process for the production of essentially isomerically pure CFC-216aa. Other embodiments include processes for the production of CFC-217ba and HFC-227ea. Particular embodiments of the present invention provide separation techniques for the separation of chlorofluorocarbons from HF, from other chlorofluorocarbons, and the separation of isomers of halogenated compounds. Still other embodiments of the present invention provide catalytic synthetic techniques that demonstrate extended catalyst lifetime. In other embodiments, the present invention provides catalytic

techniques for the purification of isomeric mixtures.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L18 ANSWER 4 OF 12 USPATFULL on STN
AN 2004:134125 USPATFULL
TI Processes for purifying chlorofluorinated compounds
IN Iikubo, Yuichi, West Lafayette, IN, UNITED STATES
Owens, Stephen, White Pine, TN, UNITED STATES
Cohn, Mitchel, West Lafayette, IN, UNITED STATES
Brandstadter, Stephan M., Indianapolis, IN, UNITED STATES
Hedrick, Vicki E., Brookston, IN, UNITED STATES
Boggs, Janet K., Brownsburg, IN, UNITED STATES
Qian, John, West Lafayette, IN, UNITED STATES
Sacarias, Julie, El Dorado, AR, UNITED STATES
PI US 2004102662 A1 20040527
AI US 2003-698730 A1 20031031 (10)
RLI Division of Ser. No. US 2001-966158, filed on 28 Sep 2001, PENDING
DT Utility
FS APPLICATION
LREP WELLS ST. JOHN P.S., 601 W. FIRST AVENUE, SUITE 1300, SPOKANE, WA, 99201
CLMN Number of Claims: 88
ECL Exemplary Claim: 1
DRWN 7 Drawing Page(s)
LN.CNT 1974

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB Methods and materials are provided for the production of essentially isomerically pure perhalogenated and partially halogenated compounds. One embodiment of the present invention provides a process for the production of essentially isomerically pure CFC-216aa. Other embodiments include processes for the production of CFC-217ba and HFC-227ea. Particular embodiments of the present invention provide separation techniques for the separation of chlorofluorocarbons from HF, from other chlorofluorocarbons, and the separation of isomers of halogenated compounds. Still other embodiments of the present invention provide catalytic synthetic techniques that demonstrate extended catalyst lifetime. In other embodiments, the present invention provides catalytic techniques for the purification of isomeric mixtures.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L18 ANSWER 5 OF 12 USPATFULL on STN
AN 2004:134124 USPATFULL
TI Processes for purifying chlorofluorinated compounds and processes for purifying CF₃CFHCF₃
IN Iikubo, Yuichi, West Lafayette, IN, UNITED STATES
Owens, Stephen, White Pine, TN, UNITED STATES
Cohn, Mitchel, West Lafayette, IN, UNITED STATES
Brandstadter, Stephan M., Indianapolis, IN, UNITED STATES
Hedrick, Vicki E., Brookston, IN, UNITED STATES
Boggs, Janet K., Brownsburg, IN, UNITED STATES
Qian, John, West Lafayette, IN, UNITED STATES
Sacarias, Julie, El Dorado, AR, UNITED STATES
PI US 2004102661 A1 20040527
AI US 2003-698579 A1 20031031 (10)
RLI Division of Ser. No. US 2001-966158, filed on 28 Sep 2001, PENDING
DT Utility
FS APPLICATION
LREP WELLS ST. JOHN P.S., 601 W. FIRST AVENUE, SUITE 1300, SPOKANE, WA, 99201
CLMN Number of Claims: 88
ECL Exemplary Claim: 1
DRWN 7 Drawing Page(s)
LN.CNT 1967

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB Methods and materials are provided for the production of essentially isomerically pure perhalogenated and partially halogenated compounds. One embodiment of the present invention provides a process for the production of essentially isomerically pure CFC-216aa. Other embodiments include processes for the production of CFC-217ba and HFC-227ea. Particular embodiments of the present invention provide separation techniques for the separation of chlorofluorocarbons from HF, from other chlorofluorocarbons, and the separation of isomers of halogenated compounds. Still other embodiments of the present invention provide catalytic synthetic techniques that demonstrate extended catalyst lifetime. In other embodiments, the present invention provides catalytic techniques for the purification of isomeric mixtures.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L18 ANSWER 6 OF 12 USPATFULL on STN
AN 2004:134123 USPATFULL
TI Processes for halogenating compounds
IN Iikubo, Yuichi, West Lafayette, IN, UNITED STATES
Owens, Stephen, White Pine, TN, UNITED STATES
Cohn, Mitchel, West Lafayette, IN, UNITED STATES
Brandstadter, Stephan M., Indianapolis, IN, UNITED STATES
Hedrick, Vicki E., Brookston, IN, UNITED STATES
Boggs, Janet K., Brownsburg, IN, UNITED STATES
Qian, John, West Lafayette, IN, UNITED STATES
Sacarias, Julie, El Dorado, AR, UNITED STATES
PI US 2004102660 A1 20040527
AI US 2003-698731 A1 20031031 (10)
RLI Division of Ser. No. US 2001-966158, filed on 28 Sep 2001, PENDING
DT Utility
FS APPLICATION
LREP WELLS ST. JOHN P.S., 601 W. FIRST AVENUE, SUITE 1300, SPOKANE, WA, 99201
CLMN Number of Claims: 88
ECL Exemplary Claim: 1
DRWN 7 Drawing Page(s)
LN.CNT 1968

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB Methods and materials are provided for the production of essentially isomerically pure perhalogenated and partially halogenated compounds. One embodiment of the present invention provides a process for the production of essentially isomerically pure CFC-216aa. Other embodiments include processes for the production of CFC-217ba and HFC-227ea. Particular embodiments of the present invention provide separation techniques for the separation of chlorofluorocarbons from HF, from other chlorofluorocarbons, and the separation of isomers of halogenated compounds. Still other embodiments of the present invention provide catalytic synthetic techniques that demonstrate extended catalyst lifetime. In other embodiments, the present invention provides catalytic techniques for the purification of isomeric mixtures.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L18 ANSWER 7 OF 12 USPATFULL on STN

AN 2004:9668 USPATFULL

TI Processes for the purification and use of 2-chloro-1,1,1,2,3,3,3-heptafluoropropane and zeotropes thereof with HF

IN Miller, Ralph Newton, Newark, DE, United States

Rao, V. N. Mallikarjuna, Wilmington, DE, United States

Swearingen, Steven H., Wilmington, DE, United States

PA E. I. du Pont de Nemours and Company, Wilmington, DE, United States
(U.S. corporation)

PI US-6677493

B1 20040113

See this

X

AI US 1999-283449

19990401 (9)

PRAI US 1998-80709P

19980403 (60)

DT Utility

FS GRANTED

EXNAM Primary Examiner: Richter, Johann; Assistant Examiner: Price, Elvis O.

CLMN Number of Claims: 19

ECL Exemplary Claim: 1

DRWN 1 Drawing Figure(s); 1 Drawing Page(s)

LN.CNT 610

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A process is disclosed for the separation of a mixture of HF and CF₃CClFCF₃. The process involves placing the mixture in a separation zone at a temperature of from about -30° C. to about 100° C. and at a pressure sufficient to maintain the mixture in the liquid phase, whereby an organic-enriched phase comprising less than 50 mole percent HF is formed as the bottom layer and an HF-enriched phase comprising more than 90 mole percent HF is formed as the top layer. The organic-enriched phase can be withdrawn from the bottom of the separation zone and subjected to distillation in a distillation column to recover essentially pure CF₃CClFCF₃. The distillate comprising HF and CF₃CClFCF₃ can be removed from the top of the distillation column while essentially pure CF₃CClFCF₃ can be recovered from the bottom of the distillation column. The HF-enriched phase can be withdrawn from the top of the separation zone and subjected to distillation in a distillation column. The distillate comprising HF and CF₃CClFCF₃ can be removed from the top of the distillation column while essentially pure HF can be recovered from the bottom of the distillation column. If desired, the two distillates can be recycled to the separation zone.

Also disclosed are compositions of hydrogen fluoride in combination with an effective amount of CF₃CClFCF₃ to form an azeotrope or azeotrope-like composition with hydrogen fluoride. Included are compositions containing from about 38.4 to 47.9 mole percent CF₃CClFCF₃.

Also disclosed are processes for producing 1,1,1,2,3,3,3-heptafluoropropane. One process uses a mixture comprising HF and CF₃CClFCF₃ and is characterized by preparing essentially pure CF₃CClFCF₃ as indicated above, and reacting the CF₃CClFCF₃ with hydrogen. Another process uses an azeotropic composition as described above, and reacts the CF₃CClFCF₃ with hydrogen in the presence of HF.

Also disclosed is a process for producing hexafluoropropene. This process is characterized by preparing essentially pure CF₃CClFCF₃ as indicated above, and dehalogenating the CF₃CClFCF₃.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L18 ANSWER 8 OF 12 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 2

AN 2003:282507 CAPLUS

DN 138:289365
TI Materials and methods for the production and purification of chlorofluorocarbons and hydrofluorocarbons
IN Iikubo, Yuichi; Owens, Stephen; Cohn, Mitchel; Brandstadter, Stephan M.;
Hedrick, Vicki E.; Boggs, Janet K.; Chien, John Chengping; Sacarias, Julie
PA Pcbu Services, Inc., USA
SO PCT Int. Appl., 66 pp.
CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2003029173	A2	20030410	WO 2002-US30729	20020927
	WO 2003029173	A3	20031030		
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	US 2003105368	A1	20030605	US 2001-966158	20010928
	EP 1430010	A2	20040623	EP 2002-780379	20020927
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, SK				
	US 2004102661	A1	20040527	US 2003-698579	20031031
	US 2004102662	A1	20040527	US 2003-698730	20031031
	US 2004102660	A1	20040527	US 2003-698731	20031031
	US 2004102663	A1	20040527	US 2003-698923	20031031
	US 2004102664	A1	20040527	US 2003-699491	20031031
PRAI	US 2001-966158	A	20010928		
	WO 2002-US30729	W	20020927		

OS CASREACT 138:289365

AB Methods and materials are provided for the production of essentially isomerically pure perhalogenated and partially halogenated compds. One embodiment of the present invention provides a process for the production of essentially isomerically pure CFC-216aa. Other embodiments include processes for the production of CFC-217ba and HFC-227ea. Particular embodiments of the present invention provide separation techniques for the separation of chlorofluorocarbons from HF, from other chlorofluorocarbons, and the separation of isomers of halogenated compds. Still other embodiments of the present invention provide catalytic synthetic techniques that demonstrate extended catalyst lifetime. In other embodiments, the present invention provides catalytic techniques for the purification of isomeric mixts.

L18 ANSWER 9 OF 12 USPATFULL on STN

AN 2003:153700 USPATFULL

TI Materials and methods for the production and purification of chlorofluorocarbons and hydrofluorocarbons

IN Iikubo, Yuichi, West Lafayette, IN, UNITED STATES

Owens, Stephen, White Pine, TN, UNITED STATES

Cohn, Mitchel, West Lafayette, IN, UNITED STATES

Brandstadter, Stephan M., Indianapolis, IN, UNITED STATES

Hedrick, Vicki E., Brookston, IN, UNITED STATES

Boggs, Janet K., Brownsburg, IN, UNITED STATES

Qian, John, West Lafayette, IN, UNITED STATES

Sacarias, Julie, El Dorado, AR, UNITED STATES

PI US 2003105368 A1 20030605

AI US 2001-966158 A1 20010928 (9)

DT Utility
FS APPLICATION
LREP BAKER & DANIELS, 300 NORTH MERIDIAN STREET, SUITE 2700, INDIANAPOLIS,
IN, 46204-1782
CLMN Number of Claims: 88
ECL Exemplary Claim: 1
DRWN 7 Drawing Page(s)
LN.CNT 2001

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB Methods and materials are provided for the production of essentially isomerically pure perhalogenated and partially halogenated compounds. One embodiment of the present invention provides a process for the production of essentially isomerically pure CFC-216aa. Other embodiments include processes for the production of CFC-217ba and HFC-227ea. Particular embodiments of the present invention provide separation techniques for the separation of chlorofluorocarbons from HF, from other chlorofluorocarbons, and the separation of isomers of halogenated compounds. Still other embodiments of the present invention provide catalytic synthetic techniques that demonstrate extended catalyst lifetime. In other embodiments, the present invention provides catalytic techniques for the purification of isomeric mixtures.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L18 ANSWER 10 OF 12 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 3
AN 2001:490662 CAPLUS
DN 135:241863
TI 13C NMR spectra of halocarbons
AU Foris, Anthony
CS Jackson Laboratory, DuPont Central Research and Development, Deepwater,
NJ, 08203, USA
SO Magnetic Resonance in Chemistry (2001), 39(7), 386-398
CODEN: MRCHEG; ISSN: 0749-1581
PB John Wiley & Sons Ltd.
DT Journal
LA English
AB 13C NMR chemical shifts and 13C-19F and 13C-1H coupling consts. are reported for 103 halocarbons. Methods used for analyzing complex spectra (e.g. simultaneous 1H and 19F broadband decoupling, 2-dimensional INAD-EQUATE/FRED, HMQC, 35,37Cl isotope effects) are briefly illustrated. Longitudinal relaxation times for CF3CCl2CH2CHClF are reported.
RE.CNT 46 THERE ARE 46 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L18 ANSWER 11 OF 12 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 4
AN 1999:659342 CAPLUS
DN 131:272325
TI Processes for the distillative purification and use of 2-chloro-1,1,1,2,3,3,3-heptafluoropropane and its azeotropes with HF in the manufacture of hexafluoropropene and 1,1,1,2,3,3,3-heptafluoropropane
IN Miller, Ralph Newton; Rao, V. N. Mallikarjuna; Swearingen, Steven H.
PA E. I. Du Pont de Nemours & Co., USA
SO PCT Int. Appl., 18 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 1

PATENT NO	KIND	DATE	APPLICATION NO.	DATE
PI WO 9951555	A1	19991014	WO 1999-US7225	19990401
W: AE, AL, AU, BA, BB, BG, BR, CA, CN, CU, CZ, EE, GD, GE, HR, HU, ID, IL, IN, IS, JP, KP, KR, LC, LK, LR, LT, LV, MG, MK, MN, MX, NO, NZ, PL, RO, SG, SI, SK, SL, TR, TT, UA, US, UZ, VN, YU, ZA, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				

See file

RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, .
 ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG,
 CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG
 AU 9933779 A1 19991025 AU 1999-33779 19990401
 EP 1066230 A1 20010110 EP 1999-915210 19990401
 EP 1066230 B1 20030910
 R: BE, DE, ES, FR, GB, IT, NL
 JP 2002510664 T2 20020409 JP 2000-542278 19990401
 US 6677493 B1 20040113 US 1999-283449 19990401
 ES 2203107 T3 20040401 ES 1999-915210 19990401
 PRAI US 1998-80709P P 19980403
 WO 1999-US7225 W 19990401

AB The separation of a mixture of HF and CF₃CClFCF₃ involves placing the mixture in a

separation zone at a temperature of from about -30° to about +100° and at a pressure sufficient to maintain the mixture in the liquid phase, so that an organic-enriched phase comprising <50 mol percent HF is formed as the bottom layer and an HF-enriched phase comprising >90 mol percent HF is formed as the top layer. The organic-enriched phase is withdrawn from the bottom of the separation zone and subjected to distillation in a distillation column to

recover essentially pure CF₃CClFCF₃. The distillate comprising HF and CF₃CClFCF₃ can be removed from the top of the distillation column while essentially pure CF₃CClFCF₃ can be recovered from the bottom of the distillation

column. The HF-enriched phase can be withdrawn from the top of the separation zone and subjected to distillation in a distillation column. The distillate comprising HF and CF₃CClFCF₃ can be removed from the top of the distillation column while essentially pure HF can be recovered from the bottom of the distillation column. If desired, the two distillates can be recycled back to the separation zone. Also disclosed are compns. of hydrogen fluoride in combination with an effective amount of CF₃CClFCF₃ to form an azeotrope-like composition with HF; included are compns. containing 38.4-47.9 mol percent CF₃CClFCF₃. Also disclosed are processes for producing 1,1,1,2,3,3,3-heptafluoropropane and hexafluoropropene.

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L18 ANSWER 12 OF 12 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 5
 AN 1975:427097 CAPLUS
 DN 83:27097
 TI Mass spectral correlations of halogenated 1,1,1,3,3,3-hexafluoropropanes and 1,1,1-trifluoroethanes
 AU Naae, Douglas G.; Wiebe, Donald A.
 CS Dep. Chem., Univ. Iowa, Iowa City, IA, USA
 SO Organic Mass Spectrometry (1974), 9(12), 1203-6
 CODEN: ORMSBG; ISSN: 0030-493X
 DT Journal
 LA English
 AB The mass spectra of 12 CF₃CXYCF₃ (X and Y = H, F, Cl, Br, and I) and 5 CF₃CX₂Y (X and Y = F, Cl, and Br) were recorded at 20 and 70 eV and the observed trends were discussed. The frequency of carbon-halogen and C-C bond cleavage was dependent on the substituents X and Y.

L23 ANSWER 1 OF 4 USPATFULL on STN
AN 97:31869 USPATFULL
TI Halocarbon hydrogenolysis
IN Manogue, William H., Newark, DE, United States
PA E. I. Du Pont De Nemours and Company, Wilmington, DE, United States
(U.S. corporation) *See this*
PI US 5621151 19970415
AI US 1995-426534 19950421 (8)
RLI Division of Ser. No. US 1994-242503, filed on 13 May 1994, now patented,
Pat. No. US 5430204 which is a continuation of Ser. No. US 1993-122102,
filed on 16 Sep 1993, now patented, Pat. No. US 5364992 And a
continuation of Ser. No. US 1992-847987, filed on 9 Apr 1992, now
abandoned
DT Utility
FS Granted
EXNAM Primary Examiner: Siegel, Alan
CLMN Number of Claims: 20
ECL Exemplary Claim: 1
DRWN No Drawings
LN.CNT 791
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB Halocarbons such as CCl₁.sub.2 F.sub.2, CF.sub.3 CFHCl or CF.sub.3
CFC₁.sub.2 which contain chlorine and/or bromine are contacted with
hydrogen in the presence of silicon carbide and/or a metal selected from
aluminum, molybdenum, titanium, nickel, iron or cobalt (or their alloys)
at temperatures of 350° to 700° C. and pressures of 0 to
1000 psig to obtain a product wherein at least one chlorine or bromine
in the starting material has been replaced by hydrogen.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L23 ANSWER 2 OF 4 USPATFULL on STN
AN 95:60539 USPATFULL
TI Halocarbon hydrogenolysis
IN Manogue, William H., Newark, DE, United States
Rao, V. N. Mallikarjuna, Wilmington, DE, United States
PA E. I. Du Pont de Nemours and Company, Wilmington, DE, United States
(U.S. corporation)
PI US-543.0204 19950704 *See this*
AI US 1994-242503 19940513 (8)
DCD 20111115
RLI Continuation of Ser. No. US 1993-122102, filed on 16 Sep 1993, now
patented, Pat. No. US 5364992 which is a continuation of Ser. No. US
1992-847987, filed on 9 Apr 1992, now abandoned which is a
continuation-in-part of Ser. No. US 1989-418832, filed on 10 Oct 1989,
now abandoned
DT Utility
FS Granted
EXNAM Primary Examiner: Siegel, Alan
CLMN Number of Claims: 20
ECL Exemplary Claim: 1
DRWN No Drawings
LN.CNT 829
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB Halocarbons such as CCl₁.sub.2 F.sub.2, CF.sub.3 CFHCl or CF.sub.3
CFC₁.sub.2 which contain chlorine and/or bromine are contacted with
hydrogen in the presence of silicon carbide and/or a metal selected from
aluminum, molybdenum, titanium, nickel, iron or cobalt (or their alloys)
at temperatures of 350° to 700° C. and pressures of 0 to
1000 psig to obtain a product wherein at least one chlorine or bromine
in the starting material has been replaced by hydrogen.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L23 ANSWER 3 OF 4 USPATFULL on STN
 AN 94:100045 USPATFULL
 TI Halocarbon hydrogenolysis
 IN Manogue, William H., Newark, DE, United States
 Rao, Velliur N. M., Wilmington, DE, United States
 PA E. I. Du Pont de Nemours and Company, Wilmington, DE, United States
 (U.S. corporation)
 PI US 5364992 19941115 *See this*
 AI US 1993-122102 19930916 (8)
 RLI Continuation of Ser. No. US 1992-847987, filed on 9 Apr 1992, now
 abandoned which is a continuation-in-part of Ser. No. US 1989-418832,
 filed on 10 Oct 1989, now abandoned
 DT Utility
 FS Granted
 EXNAM Primary Examiner: Siegel, Alan
 CLMN Number of Claims: 18
 ECL Exemplary Claim: 1
 DRWN No Drawings
 LN.CNT 789
 CAS INDEXING IS AVAILABLE FOR THIS PATENT.
 AB Halocarbons such as CCl₂ sub.2 F, CF₂ sub.3 CFHCl₂ sub.2 or CF₂ sub.3
 CFC₂ sub.2 which contain chlorine and/or bromine are contacted with
 hydrogen in the presence of silicon carbide and/or a metal selected from
 aluminum, molybdenum, titanium, nickel, iron or cobalt (or their alloys)
 at temperatures of 350° to 700° C. and pressures of 0 to
 1000 psig to obtain a product wherein at least one chlorine or bromine
 in the starting material has been replaced by hydrogen.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L23 ANSWER 4 OF 4 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1
 AN 1991:558497 CAPLUS
 DN 115:158497
 TI Halocarbon hydrogenolysis
 IN Kielhorn, Fernando Frederick; Manogue, William Henry; Rao, V. N.
 Mallikarjuna
 PA du Pont de Nemours, E. I., and Co., USA
 SO PCT Int. Appl., 33 pp.
 CODEN: PIXXD2

DT Patent
 LA English
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9105752	A1	19910502	WO 1990-US5637	19901009
	W: AU, BR, CA, JP, KR, SU, US				
	RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LU, NL, SE				
	IN 175284	A	19950603	IN 1990-CA857	19901008
	CA 2067370	AA	19910411	CA 1990-2067370	19901009
	AU 9066113	A1	19910516	AU 1990-66113	19901009
	AU 641704	B2	19930930		
	ZA 9008087	A	19920624	ZA 1990-8087	19901009
	EP 495892	A1	19920729	EP 1990-915920	19901009
	EP 495892	B1	19950719		
	R: DE, ES, GB, IT, NL				
	BR 9007726	A	19920915	BR 1990-7726	19901009
	JP 05501878	T2	19930408	JP 1990-514986	19901009
	JP 2825650	B2	19981118		
	ES 2075225	T3	19951001	ES 1990-915920	19901009
	RU 2068835	C1	19961110	RU 1990-5011233	19901009
	CN 1051167	A	19910508	CN 1990-109466	19901010
	CN 1029119	B	19950628		
	US 5364992	A	19941115	US 1993-122102	19930916

US 5430204	A	19950704	US 1994-242503	19940513
US 5621151	A	19970415	US 1995-426534	19950421
PRAI US 1989-418832	A2	19891010		
WO 1990-US5637	A	19901009		
US 1992-847987	B1	19920409		
US 1993-122102	A1	19930916		
US 1994-242503	A3	19940513		

OS CASREACT 115:158497; MARPAT 115:158497

AB A process for the hydrogenolysis of halocarbons of the general formula C_nH_mF_pX_q wherein n = 1-10, m = 0-20, p = 0-21, q = 1-22, X = Cl, Br comprises reacting said halocarbon with hydrogen in a vessel packed with particles of Al, Mo, Ti, Ni, Fe, Co or their alloys or silicon carbide or low surface area carbon at high pressures and temps. Thus, CF₃CCl₂F (1.47 g/h) and hydrogen (molar ratio of H₂/CF₃CCl₂F = 1.9) were fed into a 1/4" empty Inconel Ni alloy reactor for 38 h at 450-550° and 250 psig. A sample taken after 14 h at 550° showed 89% conversion of CF₃CCl₂F with 65% selectivity to CF₃CHClF and 32% selectivity to CF₃CH₂F. Overall selectivity of 2 products was 97%.

See also

L25 ANSWER 1 OF 5 USPATFULL on STN
 AN 2002:6200 USPATFULL
 TI Circuit arrangement and method for operating and electrical motor
 IN Gleim, Gunter, Villingen-Schwenningen, GERMANY, FEDERAL REPUBLIC OF
 PA Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, GERMANY, FEDERAL
 REPUBLIC OF (non-U.S. corporation)
 PI US 6337553 B1 20020108
 AI US 1998-80708 19980518 (9)
 PRAI DE 1997-19721490 19970523
 DT Utility
 FS GRANTED
 EXNAM Primary Examiner: Masih, Karen
 LREP Tripoli, J. S., Herrmann, E. P.
 CLMN Number of Claims: 6
 ECL Exemplary Claim: 1
 DRWN 3 Drawing Figure(s); 1 Drawing Page(s)
 LN.CNT 165
 CAS INDEXING IS AVAILABLE FOR THIS PATENT.
 AB A circuit arrangement with a digital controller for operating an electric motor and a method for starting an electric motor are disclosed. Electric motors require a considerably higher current immediately after they have been switched on and during the running-up phase because of the inductance of the motor windings. In order to increase the control sensitivity of the controller for the normal operation, the control range of a digital controller is switched over into a higher current range for the running-up phase. For the normal operation of the motor, the control range of the controller is switched back again into a lower current range. As a result, the control sensitivity of the controller is completely available for the normal operation of the motor.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L25 ANSWER 2 OF 5 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1
 AN 2001:630912 CAPLUS
 DN 135:182382
 TI 1,1,1,2,3,3,3-Heptafluoropropane manufacturing process
 IN Nappa, Mario Joseph; Rao, V. N. Mallikarjuna; Sievert, Allen Capron
 PA E. I. Du Pont de Nemours & Co., USA
 SO U.S., 5 pp.
 CODEN: USXXAM

DT Patent
 LA English
 FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 6281395	B1	20010828	US 1999-283451	19990401
PRAI US-1998-80706P	P	19980403		

AB A process is disclosed for the manufacture of CF₃CHFCF₃ containing <0.01 ppm (CF₃)₂C:CF₂. The process involves: (a) contacting hexafluoropropene in the vapor phase at <260° with hydrogen fluoride in the presence of a selected fluorination catalyst or produce a product containing <10 parts (CF₃)₂C:CF₂ per million parts of CF₃CHFCF₃; and (b) treating the product of (a) as necessary to remove excess (CF₃)₂C:CF₂. Suitable catalysts include: (i) an activated carbon treated to contain from about 0.1-10% of added alkali or alkaline earth metals; (ii) three dimensional matrix porous carbonaceous materials; (iii) supported metal catalysts comprising trivalent chromium; and (iv) unsupported chrome oxide prepared by the pyrolysis of (NH₄)₂Cr₂O₇.

RE.CNT 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L25 ANSWER 3 OF 5 USPATFULL on STN

AN 2000:10072 USPATFULL
TI Process for the production of fluorocarbons
IN Manogue, William H., Newark, DE, United States
Nappa, Mario Joseph, Newark, DE, United States
Sievert, Allen Capron, Elkton, MA, United States
Rao, V. N. Mallikarjuna, Newark, DE, United States
PA E. I. du Pont de Nemours and Company, Wilmington, DE, United States
(U.S. corporation)

PI US 6018083 20000125
AI US 1999-283450 19990401 (9)

PRAI US 1998-80708P 19980403 (60)

DT Utility
FS Granted

See filing

EXNAM Primary Examiner: Siegel, Alan
CLMN Number of Claims: 3
ECL Exemplary Claim: 1
DRWN 1 Drawing Figure(s); 1 Drawing Page(s)

LN.CNT 495

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A process is disclosed for the separation of a mixture of HF and CF₃CClFCF₃. The process involves placing the mixture in a separation zone at a temperature of from about -30° C. to about 100° C. and at a pressure sufficient to maintain the mixture in the liquid phase, whereby an organic-enriched phase comprising less than 50 mole percent HF is formed as the bottom layer and an HF-enriched phase comprising more than 90 mole percent HF is formed as the top layer. The organic-enriched phase can be withdrawn from the bottom of the separation zone and subjected to distillation in a distillation column to recover essentially pure CF₃CClFCF₃. The distillate comprising HF and CF₃CClFCF₃ can be removed from the top of the distillation column while essentially pure CF₃CClFCF₃ can be recovered from the bottom of the distillation column. The HF-enriched phase can be withdrawn from the top of the separation zone and subjected to distillation in a distillation column. The distillate comprising HF and CF₃CClFCF₃ can be removed from the top of the distillation column while essentially pure HF can be recovered from the bottom of the distillation column. If desired, the two distillates can be recycled to the separation zone.

Also disclosed are compositions of hydrogen fluoride in combination with an effective amount of CF₃CClFCF₃ to form an azeotrope or azeotrope-like composition with hydrogen fluoride. Included are compositions containing from about 38.4 to 47.9 mole percent CF₃CClFCF₃.

Also disclosed are processes for producing 1,1,1,2,3,3,3-heptafluoropropane. One process uses a mixture comprising HF and CF₃CClFCF₃ and is characterized by preparing essentially pure CF₃CClFCF₃ as indicated above, and reacting the CF₃CClFCF₃ with hydrogen. Another process uses an azeotropic composition as described above, and reacts the CF₃CClFCF₃ with hydrogen in the presence of HF.

Also disclosed is a process for producing hexafluoropropene. This process is characterized by preparing essentially pure CF₃CClFCF₃ as indicated above, and dehalogenating the CF₃CClFCF₃.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L25 ANSWER 4 OF 5 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 2

AN 1999:659340 CAPLUS

DN 131:258061

TI Process for the production of hexafluoropropylene and 1,1,1,2,3,3,3-

heptafluoropropane
 IN Manogue, William H.; Nappa, Mario Joseph; Sievert, Allen Capron
 PA E. I. Du Pont de Nemours & Co., USA
 SO PCT Int. Appl., 16 pp.
 CODEN: PIXXD2
 DT Patent
 LA English
 FAN.CNT 1

See also

PATENT-NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 9951553	A1	19991014	WO 1999-US7230	19990401
	W: AE, AL, AU, BA, BB, BG, BR, CA, CN, CU, CZ, EE, GD, GE, HR, HU, ID, IL, IN, IS, JP, KP, KR, LC, LK, LR, LT, LV, MG, MK, MN, MX, NO, NZ, PL, RO, SG, SI, SK, SL, TR, TT, UA, US, UZ, VN, YU, ZA, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG			
AU 9933780	A1	19991025	AU 1999-33780	19990401
US 6018083	A	20000125	US 1999-283450	19990401
EP 1068167	A1	20010117	EP 1999-915212	19990401
EP 1068167	B1	20030903		
	R: BE, DE, ES, FR, GB, IT, NL			
JP 2002510662	T2	20020409	JP 2000-542276	19990401
ES 2203108	T3	20040401	ES 1999-915212	19990401
PRAI US 1998-80708P	P	19980403		
WO 1999-US7230	W	19990401		
AB	Hexafluoropropylene and 1,1,1,2,3,3,3-heptafluoropropane are manufactured by: (A) feeding 1,1,2-trichloro-3,3,3-trifluoro-1-propene, HF, and Cl ₂ to a first reaction zone containing a trivalent chromium catalyst operated at 250-325° to produce an effluent comprising C ₃ Cl ₃ F ₅ , C ₃ Cl ₂ F ₆ , CF ₃ CClFCF ₃ , HCl, and HF; (B) the effluent of step A is distilled to produce (i) a low-boiling stream including HCl, (ii) a reactant stream including an azeotrope of 2-chloro-1,1,1,2,3,3,3-heptafluoropropane and HF, and (iii) a high-boiling stream including C ₃ Cl ₂ F ₆ and C ₃ Cl ₃ F ₅ ; (C) 2-chloro-1,1,1,2,3,3,3-heptafluoropropane of reactant stream (ii) is reacted with hydrogen in the presence of a catalyst to produce a mixture of hexafluoropropylene and 1,1,1,2,3,3,3-heptafluoropropane; (D) the C ₃ Cl ₂ F ₆ and C ₃ Cl ₃ F ₅ of high-boiling stream (iii) are fed along with HF to a second reaction zone containing a trivalent chromium catalyst and operated at ≥375° to produce a reaction product comprising CF ₃ CClFCF ₃ and HF; and (E) the product mixture of step D is recycled to step A. A process flow diagram is presented.			
RE.CNT 2	THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD ALL CITATIONS AVAILABLE IN THE RE FORMAT			
L25	ANSWER 5 OF 5 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 3			
AN	1993:59239 CAPLUS			
DN	118:59239			
TI	Reaction of organic compounds with a sulfur tetrafluoride-hydrogen fluoride-halogenating agent system. VII. Reactions of olefins with the SF ₄ -HF-Cl ₂ (Br ₂) system			
AU	Kunshenko, V. B.; Mohamed, Nagib Muhtar; Omarov, V. O.; Muratov, N. N.; Yagupol'skii, L. N.			
CS	Odess. Politekh. Inst., Odessa, Ukraine			
SO	Zhurnal Organicheskoi Khimii (1992), 28(4), 672-80			
	CODEN: ZORKAE; ISSN: 0514-7492			
DT	Journal			
LA	Russian			
OS	CASREACT 118:59239			
AB	Halogenated alkenes undergo halofluorination in SF ₄ -HF-Cl ₂ (Br ₂) systems. On the basis of Z- and E-1,2-dichloroethenes it was shown that these reactions proceed with anti stereospecificity via bromonium ions. The accumulation of Cl atoms in the alkene mol. hinders electrophilic addition of			

stoichiometric equivs. of ClF and BrF to the double bond. The SF₄-HF-Br₂ system is effective in fluorinating Br-containing organic compds., wherein only Br atoms on a secondary C are substituted by F.

L32 ANSWER 1 OF 2 CAPLUS COPYRIGHT 2004 ACS on STN
AN 2004:534048 CAPLUS
DN 141:89877
TI Materials and methods for the conversion of hydrofluorocarbons to
fluoromonomers
IN Iikubo, Yuichi; Hedrick, Vicki; Brandstadter, Stephen M.; Cohn, Mitchel
PA USA
SO U.S. Pat. Appl. Publ., 11 pp.
CODEN: USXXCO
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2004127757	A1	20040701	US 2002-331821	20021230
	WO 2004060842	A1	20040722	WO 2003-US41851	20031230
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU RW: BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				

PRAI US 2002-331821 A2 20021230
AB Methods and materials for the recovery of valuable hydrofluorocarbons and
subsequent conversion to fluoromonomer precursors and fluoromonomers are
disclosed. More specifically methods and materials are provided for
recovering hydrofluorocarbons such as HFC-227, HFC-236, HFC-245, HFC-125,
HFC-134, HFC-143, HFC-152, HFC-32, HFC-23 and their resp. isomers.
Processes are provided for converting hydrofluorocarbons such as these to
fluoromonomer precursors such as CFC-217, CFC-216, CFC-215, CFC-115,
CFC-114, CFC-113, CFC-112, HCFC-22, CFC-12, CFC-13 and their resp.
isomers. Materials, methods, and schemes are provided for the conversion
of these fluoromonomer precursors to fluoromonomers such as HFP, PFP, TFP,
TFE, and VDF. One example demonstrates the conversion of HFC-227 to
CFC-217 and finally to hexafluoropropene.

L32 ANSWER 2 OF 2 CAPLUS COPYRIGHT 2004 ACS on STN
AN 1986:552494 CAPLUS
DN 105:152494
TI Interaction of fluoro olefins with halogens in highly acid medium
AU Fokin, A. V.; Studnev, Yu. N.; Rapkin, A. I.; Krotovich, I. N.; Tatarinov,
A. S.; Verenikin, O. V.
CS Inst. Elementoorg. Soedin., Moscow, USSR
SO Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya (1985), (10), 2298-302
CODEN: IASKA6; ISSN: 0002-3353
DT Journal
LA Russian
OS CASREACT 105:152494
AB Halogenation of F2C:CFR (R = F, CF3) in HSO3F or HSO3F/SbF5 gave
RCFXCF2OSO2F (X = Cl, Br, iodo), RCFXCF2X (X = Cl, Br), RCFICF3, (CF3)2CFX
(X = Cl, Br) and F3CCHFCF2OSO2F in yields depending on reaction
conditions.

L33 ANSWER 1 OF 11 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 2002:539627 CAPLUS
 DN 137:95530
 TI Process for manufacturing and purifying octafluorocyclobutane
 IN Horiba, Minako; Suzuki, Yasuhiro
 PA Showa Denko K.K., Japan
 SO PCT Int. Appl., 56 pp.
 CODEN: PIXXD2
 DT Patent
 LA English
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002055458	A2	20020718	WO 2002-JP148	20020111
	WO 2002055458	A3	20030220		
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	JP 2002212118	A2	20020731	JP 2001-6459	20010115
	EP 1307416	A2	20030507	EP 2002-729558	20020111
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
	US 2003132099	A1	20030717	US 2002-221443	20020912
PRAI	JP 2001-6459	A	20010115		
	US 2001-264322P	P	20010129		
	WO 2002-JP148	W	20020111		
AB	Octafluorocyclobutane is purified by contacting crude octafluorocyclobutane containing impurities with an impurity decomposing agent at elevated temperature and then with an adsorbent to substantially remove the impurities from the crude octafluorocyclobutane. The obtained octafluorocyclobutane is substantially free of impurities and therefore, can be used as an etching or cleaning gas in the production of semiconductor devices or the like.				

online analyses, gas chromatog. probably offers the greatest flexibility at the most reasonable cost. This paper describes a chromatog. database that provides for the identification of refrigerant components, and thereby facilitates composition management of zeotropic fluids. Prior to the description of the database a description is given of the basic theory of chromatog. retention parameters and the exptl. techniques used in their measurement.

RE.CNT 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L33 ANSWER 3 OF 11 CAPLUS COPYRIGHT 2004 ACS on STN
AN 1996:148274 CAPLUS
DN 124:249231
TI Kovats Retention Indexes of Halocarbons on a Hexafluoropropylene Epoxide-Modified Graphitized Carbon Black
AU Bruno, Thomas J.; Wertz, Kelly H.; Caciari, Michael
CS Thermophysics Division, National Institute of Standards and Technology, Boulder, CO, 80303, USA
SO Analytical Chemistry (1996), 68(8), 1347-59
CODEN: ANCHAM; ISSN: 0003-2700
PB American Chemical Society
DT Journal
LA English
AB Kovats retention indexes of 97 halocarbons related to research on alternative refrigerants, propellants, foaming agents, and blowing agents were measured on a packed column stationary phase consisting of a 5% (mass/mass) coating of a low mol. weight polymer of hexafluoropropylene epoxide on graphitized carbon black. The measurements on each fluid were made at four temps., and the thermal dependence of the indexes was modeled with appropriate equations. The modeled values are suitable for the identification of these compds. by gas chromatog. on both laboratory and field instrumentation. The values are also useful for the optimization of more sophisticated analyses needed in specific situations. The stationary phase chosen will provide separation of nearly all the fluids of interest. Also, there is sufficient spread in the retention index values to facilitate fluid identification. The measurements also appear to fit a qual. triangular property diagram that was useful for classifying alternative refrigerant fluids and related compds.

L33 ANSWER 4 OF 11 CAPLUS COPYRIGHT 2004 ACS on STN
AN 1995:739446 CAPLUS
DN 123:305689
TI Retention of halocarbons on a hexafluoropropylene epoxide-modified graphitized carbon black. IV. Propane-based compounds
AU Bruno, Thomas J.; Wertz, Kelly H.; Caciari, Michael
CS Thermophysics Division, Chemical Science and Technology Laboratory, National Institute of Standards and Technology, Boulder, CO, 80303, USA
SO Journal of Chromatography, A (1995), 708(2), 293-302
CODEN: JCRAEY; ISSN: 0021-9673
PB Elsevier
DT Journal
LA English
AB The retention characteristics of 25 propane-based bromofluorocarbon, chlorocarbon, chlorofluorocarbon, and fluorocarbon fluids were studied as a function of temperature on a stationary phase consisting of a 5% (m/m) coating of a low-mol.-mass polymer of hexafluoropropylene epoxide on a graphitized carbon black adsorbent. Measurements were performed at 0, 20, 40 and 60° for R-245ca and R-245cb. Measurements were performed at 20, 40, 60 and 80° for R-227ca, R-227ea, R-236ea, R-236fa, R-245fa, and R-263fb. Measurements were performed at 40, 60, 80 and 100° for R-217ba, R-254cb and R-1243b, and at 60, 80, 100 and 120° for R-280da and R-217caB1. Measurements were performed at 80, 100, 120 and 140° for R-215aa, R-216ba, R-253fb, R-262da, and R-270aa.

Measurements were performed at 100, 120, 140 and 160° for R-215ba, R-225ca, R-225cb, R-243db, R-270da, R-270fa, and R-270fb. Relative retentions as a function of temperature were calculated with respect to the retentions of tetrafluoromethane (R-14) and hexafluoroethane (R-116). Qual. features of the data are examined, and trends are identified. The relative retention data were fitted to linear models for the purpose of predicting retention behavior of these compds. to facilitate chromatog. anal.

L33 ANSWER 5 OF 11 CAPLUS COPYRIGHT 2004 ACS on STN
AN 1993:516774 CAPLUS
DN 119:116774
TI Preparation of 1,1,1,2,3,3-heptafluoropropane (R 227) via catalytic hydrodechlorination of chloroheptafluoropropane
IN Hopp, Peter
PA Hoechst A.-G., Germany
SO Eur. Pat. Appl., 3 pp.
CODEN: EPXXDW
DT Patent
LA German
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 539989	A1	19930505	EP 1992-118515	19921029
	EP 539989	B1	19970618		
	R: BE, CH, DE, DK, ES, FR, GB, IT, LI, NL, SE				
	ES 2104790	T3	19971016	ES 1992-118515	19921029
	CA 2081813	AA	19930502	CA 1992-2081813	19921030
	CA 2081813	C	20040113		
	JP 05221894	A2	19930831	JP 1992-293383	19921030
	JP 3249202	B2	20020121		
PRAI	DE 1991-4136054	A	19911101		
AB	CF ₃ CHFCCF ₃ was prepared by hydrodechlorination of CF ₃ CClFCF ₃ (I) using the catalysts Pt, Pd, Ru, Rh, Ni, or Cu at 100-400° and 1-50 bar H ₂ . The molar ratio of I with H ₂ was 1:1 to 1:10.				

L33 ANSWER 6 OF 11 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 1982:34523 CAPLUS
 DN 96:34523
 TI 2-Chloro-1,1,1,2,3,3,3-heptafluoropropane by photochlorination of
 1,1,1,2,3,3,3-heptafluoropropane
 IN Von Halasz, Sigmar Peter
 PA Hoechst A.-G., Fed. Rep. Ger.
 SO Ger. Offen., 14 pp.
 CODEN: GWXXBX
 DT Patent
 LA German
 FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 3017154	A1	19811112	DE 1980-3017154	19800505
ES 501729	A1	19820216	ES 1981-501729	19810428
EP 39471	A1	19811111	EP 1981-103200	19810429
R: BE, DE, FR, GB, IT, NL				
JP 56169632	A2	19811226	JP 1981-65307	19810501
BR 8102724	A	19820126	BR 1981-2724	19810504
CA 1162511	A1	19840221	CA 1981-376831	19810504
PRAI DE 1980-3017154		19800505		
AB CF ₃ CFC ₁ CF ₃ (I) was prepared by photochem. chlorination of CF ₃ CHFCF ₃ (II) at -30 to +500° (especially 40-450°) and a II-Cl Mol ratio 1:1.0-1.5, especially 1:1.05-1.15; a typical product contained 98.1% I.				

L33 ANSWER 7 OF 11 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 1965:488299 CAPLUS
 DN 63:88299
 OREF 63:16189b-c
 TI Influence of substitution on CH.CF and CF.CF coupling constants
 AU Abraham, R. J.; Cavalli, L.
 CS Univ. Liverpool, UK
 SO Molecular Physics (1965), 9(1), 67-75
 CODEN: MOPHAM; ISSN: 0026-8976
 DT Journal
 LA English
 AB The dependence of the coupling constant in CH.CF and CF.CF fragments on the
 electronegativities of the substituents, in the light of all acceptable
 data, was investigated, JHFAV obeyed the equation JFFAV = 53.03-3.38
 ΣE , while JHFAV \approx 91.4-6.15 ΣE , where ΣE is the
 sum of electronegativities of the 1st atom of the remaining substituents.
 Consideration of these equations, and of that for JHHAV showed that for
 highly electroneg. substituents all 3 couplings decrease to 0. The temperature
 dependence of the F-F couplings in some unsym. substituted ethanes was
 found due to the change in jFF with temperature and not the changing
 populations
 of the rotational isomers. 29 refs.

L33 ANSWER 8 OF 11 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 1956:19880 CAPLUS
 DN 50:19880
 OREF 50:4048d-h
 TI The reactions of highly fluorinated organic compounds. IX.
 1H-De α fluoro-4-trifluoromethylcyclohexane, nonafluoro-4-trifluoromethyl-1-
 cyclohexene, and perfluoro-(3-methyladipic) acid
 AU Barlow, G. B.; Stacey, M.; Tatlow, J. C.
 CS Univ. Birmingham, UK
 SO Journal of the Chemical Society, Abstracts (1955) 1749-52
 CODEN: JCSAAZ; ISSN: 0590-9791
 DT Journal
 LA Unavailable
 AB cf. C.A. 50, 1617b. p-Cymene and CoF₂ at 260-80° gives

perfluoro-(1-methyl-4-isopropyl cyclohexane) (I), b. 144-6°, nD16 1.3006. Similarly, p-ClC₆H₄Me or p-ClC₆H₄CF₃ gives perfluoro(methylcyclohexane) (II), b. 75.5-5.8°, nD17 1.285, and 4-chlorotridecafluoro(methylcyclohexane) (III), b. 102-3°, nD17 1.314. II and PhMe passed through a tube at 540-55° give a compound b. below -10°, probably CF₃CHFCF₃, dibenzyl, and 4H-tridecafluoro-(methylcyclohexane) (IV), b. 85.1-6.3°. Similarly, II and Cl at 540-55° give CF₃CFClCF₃, b. 0°, and III. II and Br at 510° give CF₃CFBrCF₃, b. 15-16°, and 4-bromotridecafluoro(methylcyclohexane), b. 115.2-16.1°. Pyrolysis of II, perfluorodicyclohexyl, or perfluoro(isopropylcyclohexane) at 550-600° alone or mixed with one another gives only deep decomposition from which no pure compds. can be isolated. III and LiAlH₄ give IV. IV refluxed 5 hrs. with aqueous KOH gives nonafluoro-4-trifluoromethyl-1-cyclohexene (V), b. 75.4-5.9°, nD20 1.293 which adds Br to give the 1,2-dibromo compound, b. 156-9°, and Cl to give the 1,2-dichloro compound, b. 129-31°. V and KMnO₄ give very hygroscopic perfluoro-(3-methyladipic) acid (VI), m. 60-1° [di-(S-benzylthiuronium) salt, m. 208°; diethyl ester, b14 112°, nD12 1.361; diamide, m. 168-9°]. The di-K salt of VI decarboxylates when heated in ethylene glycol to give 1H,4H-heptafluoro-2-trifluoromethylbutane, b. 63-5°. Heating this with KOH gives F ion.

L33 ANSWER 9 OF 11 USPATFULL on STN
 AN 2003:192299 USPATFULL
 TI Process for purifying octafluorocyclobutane, process for preparing the same, and use thereof
 IN Horiba, Minako, Kanagawa, JAPAN
 Suzuki, Yasuhiro, Kanagawa, JAPAN
 PI US 2003132099 A1 20030717
 AI US 2002-221443 A1 20020912 (10)
 WO 2002-JP148 20020111
 PRAI JP 2001-6459 20010115
 DT Utility
 FS APPLICATION
 LREP SUGHRUE MION, PLLC, 2100 PENNSYLVANIA AVENUE, N.W., WASHINGTON, DC, 20037
 CLMN Number of Claims: 32
 ECL Exemplary Claim: 1
 DRWN No Drawings
 LN.CNT 1238

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A process for purifying octafluorocyclobutane according to the present invention is characterized by contacting a crude octafluorocyclobutane containing impurities with an impurity decomposing agent under elevated temperature and then with an adsorbent to substantially remove the impurities from the crude octafluorocyclobutane.

According to the purification process or preparation process of octafluorocyclobutane of the present invention, the impurities such as fluorocarbon can be substantially removed and a high-purity octafluorocyclobutane can be easily obtained. The octafluorocyclobutane obtained by the purification process of the present invention is substantially free of impurities and therefore, can be used as an etching or cleaning gas for use in the production process of a semiconductor device or the like.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L33 ANSWER 10 OF 11 CAOLD COPYRIGHT 2004 ACS on STN
 AN CA63:16189b CAOLD
 TI influence of substitution on CH.CF and CF.CF coupling consts.
 AU Abraham, Raymond J.; Cavalli, L.

TI tautomeric relations in S-containing heterocycles
AU Wollner, Thomas E.

L33 ANSWER 11 OF 11 CAOLD COPYRIGHT 2004 ACS on STN
AN CA50:4048e CAOLD

TI Reactions of highly fluorinated organic compds. - (IX) 1H - decafluoro - 4 - trifluoromethylcyclohexane, nonafluoro-4-trifluoromethyl-1-cyclohexene, and perfluoro-(3-methyladipic) acid

AU Barlow, G. B.; Stacey, M.; Tatlow, J. C.

(FILE 'HOME' ENTERED AT 12:05:35 ON 03 AUG 2004)

FILE 'REGISTRY' ENTERED AT 12:05:53 ON 03 AUG 2004

L1 1 S 1,1,1,2,3,3,3-HEPTAFLUOROPROPANE/CN
L2 1 S 2,2-DICHLORO-1,1,1,3,3,3-HEXAFLUOROPROPANE/CN
L3 1 S 2-CHLORO-1,1,1,2,3,3,3-HEPTAFLUOROPROPANE/CN
L4 1 S HYDROGEN FLUORIDE/CN
L5 0 S 1,1,1,2,2,3,3-OCTAFLUOROPROPANE/CN
L6 1 S OCTAFLUOROPROPANE/CN
L7 1 S CHLORINE/CN
L8 1 S HYDROGEN/CN

FILE 'CAPLUS, USPATFULL, CA, CAOLD' ENTERED AT 12:13:49 ON 03 AUG 2004

L9 22 S L1 AND L2
L10 20 S L9 AND L3
L11 18 S L10 AND L4
L12 5 S L11 AND L7
L13 2 S L11 AND L8
L14 0 S L11 AND L6
L15 3 DUP REM L12 (2 DUPLICATES REMOVED)
L16 0 S L13 NOT L12
L17 17 S L9 NOT L12
L18 12 DUP REM L17 (5 DUPLICATES REMOVED)
L19 58 S L1 AND L3
L20 38 S L19 NOT L9
L21 9 S L20 AND L4
L22 5 S L20 AND L8
L23 4 DUP REM L22 (1 DUPLICATE REMOVED)
L24 9 S L21 NOT L22
L25 5 DUP REM L21 (4 DUPLICATES REMOVED)
L26 0 S L25 AND L8
L27 29 S L20 NOT L21
L28 24 S L27 NOT L22
L29 13 DUP REM L28 (11 DUPLICATES REMOVED)
L30 0 S L29 AND L8
L31 0 S L29 AND L4
L32 2 S L29 AND L7
L33 11 S L29 NOT L32
L34 0 S L33 AND L6